REPORT OF GEOTECHNICAL EXPLORATION
FOR
SOWER BOULEVARD SITE
FRANKFORT, KENTUCKY
PROJECT NO. 1183-14-027
JULY 25, 2014

Prepared For

Commonwealth of Kentucky Finance and Administration Cabinet
Department for Facilities and Support Services
Division of Engineering and Contract Administration
403 Wapping Street, 1st Floor
Frankfort, Kentucky 40601

Prepared by
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July 25, 2014

Commonwealth of Kentucky Finance and Administration Cabinet
Department for Facilities and Support Services
Division of Engineering and Contract Administration
403 Wapping Street, 1st Floor
Frankfort, Kentucky 40601

Attention: Mr. Andy Casebier, Architect

Subject: **Report of Geotechnical Exploration**
Sower Boulevard Site
Frankfort, Kentucky
S&ME Project Number 1183-14-027

Dear Mr. Casebier:

S&ME, Inc. has completed the preliminary geotechnical exploration for the development of the property at the south end of Sower Boulevard in Frankfort, Kentucky. The purpose of this preliminary exploration is to obtain a general understanding of the subsurface conditions at this site and to assist in project development and planning. A design phase (final) geotechnical exploration will be performed by the Developer for the final design. We conducted this project in general accordance with S&ME Proposal No. 11-1400041 dated April 29, 2014 which was authorized by Commonwealth of Kentucky Delivery Order DO2-785-14000012351. This report explains our understanding of the project, documents our findings, and presents our conclusions and geotechnical engineering considerations.

S&ME appreciates the opportunity to provide these services to the Kentucky Finance and Administration Cabinet. If you have any questions, please call.

Respectfully submitted,
S&ME, Inc.

Daniel Furgason w/permission

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STATE OF KENTUCKY
7/25/14
ANDREW M. FIEHLER
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LICENSED PROFESSIONAL ENGINEER

Attachments: Report of Geotechnical Exploration

2014 Projects / 1183-14-027 Report

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Sower Boulevard Site
Frankfort, Kentucky
S&ME Project No. 1183-14-027

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1.0 INTRODUCTION

S&ME, Inc. has completed the preliminary geotechnical exploration for the development of the property at the south end of Sower Boulevard, also known as the Carpenter Farm, in Frankfort, Kentucky. The purpose of this preliminary exploration is to obtain a general understanding of the subsurface conditions at this site and to assist in project development and planning. A design phase (final) geotechnical exploration will be performed by the Developer for the final design. We conducted this project in general accordance with S&ME Proposal No. 11-1400041 dated April 29, 2014 which was authorized by Commonwealth of Kentucky Delivery Order DO2-785-14000012351. This report explains our understanding of the project, documents our findings, and presents our conclusions and geotechnical engineering considerations.

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2.0 PROJECT INFORMATION

2.1 Site Description

The project site is located at the southern end of Sower Boulevard in Frankfort, Kentucky. The property is approximately 34 acres. The Site Topographic and Boundary Survey performed by HDR, Inc., dated April 18, 2014 indicates the site slopes downhill from the high point at the southern property edge at an approximate elevation of 810 feet. The site slopes downhill from the high point to approximately 772 feet near the southwest corner, 758 feet near the northwest corner and 752 feet along the east edge of the property.

The site is undeveloped with mostly open field and pasture with a few scattered trees and a tree-lined fence row. Prior to performing the field work, the south-western third of the site was bushhogged to remove overgrown brush and briars. The remainder of the property was overgrown with waist high weeds and brush with scattered clusters of trees and tree lined fence rows.

At least five closed depressions, indicating possible karst conditions, were present on the site.

2.2 Project Description

The Commonwealth of Kentucky will solicit proposals from developers to design and construct a 334,100 square foot office building on the state owned land. The configuration of the building(s) has not been determined. Conceptual planning performed by Sherman/Carter/Barnhart Architects suggests a four to five story building, however, the developer and their design team will determine the final location and configuration of the office building(s) to meet the size specified. The new parking lot areas will have spaces for 1,330 vehicles.

Since the project is in the preliminary design stage, no additional drawings, site grading or structural loading are currently available.

3.0 SITE GEOLOGY

A review of the *Frankfort East Quadrangle, Franklin County, Kentucky,* developed by the USGS indicates the site is underlain by Upper Lexington Limestone and Tanglewood Limestone. The Upper Lexington Limestone consists of the Devils Hollow Member and the Millersburg Member. The Devils Hollow is generally dark blueish gray to tannish gray, weathering to light brownish gray, micro- to fine-grained limestone, with no fossils, very thin to thin bedded and interbedded with shale. The Millersburg is generally interbedded limestone (65 to 75 percent) and shale, medium light gray, very fine to coarse grained, contains many fossils and is irregularly bedded. The Tanglewood Limestone, present primarily on the north and east side of the site, is medium to dark gray, fine to coarse grained, with very thin to thin beds and contains many small fossils.

While cavities and sink holes are common in the Tanglewood Limestone, the formation is more notable for an erratic bedrock surface and the development of soil filled, solution widened slots in the bedrock. At least two of our borings, borings B-20 and B-45, encountered such slots in the bedrock. Boring B-20 falls on an approximate line with the mapped sinkholes. Boring B-45 is also near a mapped sinkhole.

The map below shows the USGS mapped sink holes on the site. Most of the site is an area considered with a high potential for karst development. The southwest area of the site is generally indicated to have a moderate potential for karst development.

No faults are mapped on the USGS mapping in the area of the site. Regional dip across the site is relatively flat.

4.0 EXPLORATION METHODS

The procedures used by S&ME for field and laboratory sampling and testing are in general accordance with ASTM procedures and established engineering practice. Appendix B contains brief descriptions of the procedures used in this exploration.

4.1 Field Exploration

Andrew Fiehler, P.E., of S&ME visited the site to observe pertinent site features, surface indications of the site geology, to log the borings, and to direct drilling operations. A total of 88 soil test borings were advanced for this exploration. The borings were numbered B-1 through B-88. The boring locations and elevations were determined by an S&ME survey crew. Please note that our survey crew checked several spot elevations from the HDR survey to verify agreement. While most of the elevations were in agreement, a discrepancy of about three feet was noted with the benchmark iron pin at the end of Sower Boulevard with a noted elevation of 778.54 feet. Figure 2 in Appendix A shows the locations of the borings.

The borings were advanced using a track-mounted Deidrich D-50 drill rig using 4 1/4-inch O.D. augers. The drillers obtained soil samples in the soil test borings using a split-barrel sampler driven by an automatic hammer system in general accordance with ASTM D1586. We also

obtained three relatively undisturbed Shelby tube samples using direct push methods. Rock coring was performed upon auger refusal at 12 of the boring locations. The stratification lines shown on the Test Boring Records represent the approximate boundaries between soil and/or rock surfaces. The transitions may be more gradual than shown.

4.2 Laboratory Testing

The S&ME engineer sealed and returned the soil samples to our laboratory where he assigned the applicable laboratory tests. These tests are used to determine the engineering properties of the soil. All soil samples were visually classified by the geotechnical engineer in general accordance with the Unified Soil Classification System (ASTM D2487). We conducted natural moisture content determinations and Atterberg limits tests on selected soil samples to aid in classification. We conducted a standard Proctor test on composite bulk samples from Borings B-40, B-52, B-75 and B-84. California Bearing Ratio (CBR) tests were performed on bulk soil samples obtained from Borings B-52 and B-84. Unconfined compressive strength tests were performed on relatively undisturbed Shelby tube soil samples from Borings B-8, B-19, and B-35. Unconfined compressive strength tests were performed on bedrock core samples from borings B-12, B-15, B-22, B-25, B-31, B-37, B-47, B-50, B-66, B-68, and B-81. The obtained laboratory data and descriptions of the tests are included in Appendix C.

5.0 SUBSURFACE CONDITIONS

5.1 General Soil Profile

Our borings initially penetrated from 1 to 12 inches of topsoil (average 5.5 inches) underlain by low plasticity Lean Clay (CL) to a depth of up to 6.0 feet (average depth of 2.6 feet). The Lean Clay was brown, generally firm to very stiff with trace amounts of oxide nodules. The Lean Clay was soft at borings B-21, B-37 and B-65. Lean Clay was not encountered at five of the borings. Below the lean clay and topsoil high plasticity Fat Clay (CH) was encountered and extended to the weathered limestone horizon. The Fat Clay (CH) was brown to dark brown, generally firm to hard with trace amounts of oxide nodules. Chert fragments were observed in samples at a few locations. The Fat Clay was encountered to a depth of 30 feet at Borings B-45, and included limestone floaters from 6.0 to 15.0 feet, and was soft below a depth of 15.0 feet. No Fat Clay was encountered in Borings B-19, B-46 or B-48.

Below the clay, 0.2 to 3.6 feet (average 0.7 feet) of weathered limestone was encountered beginning at depths of 0.2 to 31.0 feet (Elevation 803.2 to 749.8 feet). Auger refusal, interpreted to be limestone, was encountered at depths of 0.5 to 32.2 feet (Elevation 802.7 to 748.6 feet). The depth to weathered rock could extend deeper than the auger refusal depth.

Limestone bedrock was cored to depths of 9.0 to 11.7 feet at 12 of the boring locations. The rock was generally light gray and fine to medium grained with Rock Quality Designation (RQD) of 31 to 100 percent. RQD values of 21 and 0 percent were measured in the top two feet of rock core at Borings B-63 and B-68. The RQD at Boring B-81 varied from 17 to 80 percent. One or more thin clay seams were observed in the cored rock at most of the borings where rock was cored. Small, minor solution cavities were observed in the limestone at Boring B-22.

Please refer to the Test Boring Records in Appendix B for details.

5.2 Groundwater

Groundwater seepage was not observed in any of the borings during drilling and all of the borings were dry upon completion of augering. The borings were backfilled with auger cuttings after the completion of drilling. As such, 24-hour water levels were not measured.

6.0 LABORATORY TEST RESULTS

Natural moisture contents of the low plasticity lean clay ranged from 3.7 to 34.7 percent. Atterberg limit tests of the lean clay indicated liquid limits ranging from 47 to 49 percent with a plasticity index ranging from 25 to 29 percent. Natural moisture contents for the high plasticity fat clay ranged from 10.3 to 37.2 percent. Atterberg limit tests of the fat clay indicated liquid limits ranging from 63 to 75 percent with a plasticity index ranging from 35 to 48 percent.

Two standard Proctor tests of bulk sample indicated a maximum dry density of 98.0 and 97.1 pcf at an optimum moisture content of 22.7 and 24.3 percent, respectively. Two California Bearing Ratio (CBR) tests of the bulk sample materials indicated CBR values of 3.1 and 4.1 percent. Unconfined compression testing (Q_u) was performed on undisturbed samples at three borings. The locations of the samples and test results are included in Table 1, below.

Table 1
Soil Strength Test Results

Boring	Depth (feet)	Soil Type	Q_u (psf)
B-8	3.0 – 5.0	CL	2,698
B-19	3.0 – 5.0	CH	1,562
B-35	3.0 – 5.0	CH	5,346

Unconfined compression tests (Q_u) were also performed on representative rock core samples from each of the 12 borings with rock core. The locations of the samples and test results are included in Table 2, below and in the Laboratory Summary Sheets in Appendix C.

Table 2
Rock Core Strength Test Results

Boring	Depth	Q_u (psi)
B-12	7.3 – 7.9	6,382
B-15	10.0 – 10.5	8,442
B-22	8.7 – 9.3	5,469
B-25	5.5 – 6.3	8,809
B-31	9.4 – 9.8	6,049
B-37	4.0 – 4.9	11,606
B-47	2.6 – 3.1	16,495
B-50	7.4 – 7.8	19,052
B-63	18.0 – 18.4	6,887
B-66	14.7 – 15.4	10,446
B-68	7.6 – 8.0	8,562
B-81	17.3 – 17.7	8,320

7.0 GEOTECHNICAL CONSIDERATIONS

We identified the following key issues that will impact the proposed site planning and construction:

Variable Rock Elevation - Foundations

Based on the anticipated loads for a multi-story building, foundations will likely be founded on bedrock. The bedrock is generally shallow thus we anticipate foundations bearing on bedrock; however the surface of the bedrock varies from an elevation 802.7 feet to 748.6 feet across the site. On a preliminary basis, we anticipate an allowable bearing pressure of 20 kips per square foot (ksf) to 50 ksf would be suitable for support of spread foundations on intact bedrock. This should be confirmed once foundation loads are available and more detailed analyses is performed. During foundation construction, 2-inch diameter probe holes should be drilled into the bedrock to allow for observation of the continuity of the bedrock. If seams or voids are observed in the bedrock, additional excavation may be required.

Karst Conditions

Sink holes were observed on the site and have been previously mapped as shown in Section 3.0 of this report. At least two of our borings encountered soil filled, solution widened slots in the bedrock. Additional investigation and remediation should be performed on these areas prior to construction. Boring B-45 was located adjacent to a previously mapped sink hole shown in the existing parking area northeast of the site. Soft, deep weak soils were encountered at this location.

Buildings should be sited away from known sinkholes. S&ME recommends the building not be constructed in the vicinity of Boring B-45 unless deep foundations, extended to bedrock are used. Consideration should also be given to siting the building either southwest or northeast of a line between borings B-20 and B-79. Pavement areas are often constructed over remediated sinkholes areas.

Additional exploration is needed to delineate the extent of the potential sinkholes at the site. Delineation of sinkholes can be accomplished by several methods including:

- Drilling a series of closely spaced rock soundings in an X pattern across the mapped depressions.
- Excavating test pits an X pattern across the mapped depression to expose the bedrock surface.
- Using geophysical testing, primarily electrical resistivity, to map the subsurface conditions.

Each of these approaches has their strong and weak points. Drilling soundings is a relatively inexpensive approach but requires that the drill rig be able to access the depression. Steep slopes may prevent access to portions of several of the depressions. Inferences of the bedrock profile must also be made between the sounding locations. While excavating test pits allows for a visual examination of the subsurface, excavating equipment has a limited reach. If the bedrock depth is beyond the extent of the equipment sufficient information may not be obtained. Electrical resistivity testing can provide a detailed profile of the subsurface with no visual impact to the site. Karst features can also be delineated after the topsoil has been stripped; however, waiting until earthwork has begun does not aid in site planning or budgeting for repair of sinkholes.

Prior to placing soil fill is also an opportune time to remediate sinkholes. Each sinkhole is unique and should be evaluated by an S&ME engineer who will provide recommendations for repair. Our experience indicates that one of the more cost effective means of repairing sinkholes

is to excavate the soil from the sinkhole area to expose the throat of the sinkhole and construct an inverted rock filter. An inverted rock filter consists of lining the sinkhole throat/excavation with filter fabric and backfilling the excavation with crushed stone starting with larger stone at the bottom and decreasing the size of the stone as the hole is filled. Typically the largest stone size used is rip-rap; however, we expect that the sinkholes at the site will be relatively shallow and may only require KYDOT #2 sized stone and smaller. Once the excavation is backfilled within about two feet of the surrounding grade, the filter fabric is folded over the top of the crushed stone and the area is capped with compacted clay.

High Plasticity Soils

Atterberg limits testing performed during this preliminary exploration indicate that the soil beginning at depths ranging from just below the topsoil to about five feet below the existing ground surface is comprised of high plasticity fat clay (CH). Soils with plasticity indices greater than 30 percent have a tendency to shrink and swell with changes in moisture content. The tested samples of the fat clay exhibited a plasticity index of 35 to 48 percent. Lightly loaded structural elements such as slabs-on-grade, sidewalks, pavement areas and non-load bearing walls are most susceptible to damage from shrinking and swelling soils. The final geotechnical exploration should include additional plasticity testing and swell testing to further define the engineering properties of the soil, and to determine the magnitude that the Fat Clay will impact development prior to implementing costly procedures to mitigate the plasticity issue.

Site Grading / Earthwork

The site grading operations will likely produce three distinct materials – soil, a soil/rock mixture, and shot rock. Each of these materials requires different methods for placement as structural fill.

Soil –Ideally, structural soil fill is defined as inorganic natural soil with a maximum particle size of 3 inches, plasticity index of 30 or less, and maximum dry density of at least 95 pounds per cubic foot (pcf) when tested by the standard Proctor method (ASTM D698). The standard Proctor tests performed indicate the on-site soils to have a maximum dry density of greater than 95 pcf; however, the plasticity index on two of the four samples exceeded 30 percent.

The fat clay encountered at the site is common throughout central Kentucky. Rather than wasting large volumes of soil that do not meet the structural fill criteria or importing soil that does meet these criteria in areas under building slabs and pavements, we recommend placing the higher plasticity soils in deeper fill areas (at least 3 feet below subgrade) and capping the fat clay with lean clay.

During construction, additional standard Proctor and Atterberg limits testing of fill soils should be performed to determine the moisture/density relationship and assess the plasticity of the soil prior to use as structural soil fill. Structural fill should be placed in relatively thin (6- to 8-inch) layers and compacted to at least 98 percent of the standard Proctor maximum dry density for the building pad and parking lot areas. The moisture content of the fill material should be maintained within 3 percent of optimum in order to obtain proper compaction**.**

In-place density testing must be performed on structural soil fill as a check that the previously recommended compaction criteria have been achieved. This allows our project engineer to monitor the quality of the fill construction and verify that his design criterion is being achieved in the field. We further recommend that these tests be performed on a full-time basis by S&ME. The testing frequency for density tests performed on a full-time basis can be determined by our personnel based on the area to be tested, the grading equipment used, and construction schedule. Tests should be performed at vertical intervals of one-foot or less as the fill is being placed.
The on-site soils are sensitive to changes in moisture content, thus they will pump and rut during wet conditions. If grading operations are performed during periods of wet weather, these materials will not perform satisfactory during proofrolling. If soft or wet soils are encountered during the proofrolling observations, we recommend that the area be undercut to stiff native soils or stabilized in-place. Typical stabilization consists of undercutting/backfilling, placement of large crushed stone, or placement of geotextile/geogrid. Lime stabilization also works well and has the advantage of leaving the material in-place and reducing the potential for swell beneath slabs-on-grade. An alternative to wasting the wet clay soils is to temporarily stockpile this material for aeration and proper placement during dryer conditions. **As such, we highly recommend that earthwork be performed during the warm, dry summer months.**

Soil/Shot rock Mixture – The mass excavation will likely generate material that consists of both soil and rock. The soil/shot-rock mixture will be generated primarily during removal of the weathered rock zone and in mass rock excavations after blasting. Our experience is that compaction problems occur when the soil/shot-rock mix is placed using "normal rock placement procedures". The soil/shot-rock mixture is a problematic material from an earthwork perspective, as it is difficult to compact. Soil/shot-rock should not be used as fill under the proposed structures.

Placing the soil/rock mix requires using modified soil fill procedures to reduce the potential for future problems. If the mix contains more than 15 percent soil, it should be placed using the

modified soil fill procedures described in this paragraph. For the soil/rock mix, the lift thickness should be maintained between 8 and 12 inches and the moisture content of the soil portion should be near the optimum moisture content or slightly above. The maximum particle size should be limited to 12 inches in any one dimension. A combination of tracked equipment, heavy rubber tired vehicles (haul trucks, scrapers, etc.), and a Caterpillar 815 or larger sheepsfoot compactor are typically adequate for placing this material. Approval of the lift placement and compaction will be determined by a S&ME engineer on the basis of the moisture content of the soil within the matrix, the blend of rock pieces, and the behavior of the fill material under the compactive effort. The goal is to minimize voids and to promote the breakdown of weak point-to-point contact of the rock pieces.

Shot rock – After the soil overburden and weathered rock zone has been removed, bedrock removal will likely be required. We anticipate that blasting will be required to remove most of the bedrock. Typically, blasting contractors will "overshoot" the rock to depths below the required elevations. As such, the blasted material will need to be removed to competent bedrock. **Any "heaved rock" resulting from blasting operations should be removed to expose the underlying undisturbed bedrock. "Heaved rock" is not adequate for supporting the proposed building, floor slabs, and/or pavement areas.**

The shot-rock material generated from bedrock excavation at the site can also be used as structural fill material, especially under the pavement areas. Shot-rock fill should not be used beneath the proposed building pads. Shot-rock fill is defined as clean shot-rock that contains less than 10 percent soil content. The following criteria are recommended for shot-rock fill construction:

- The subgrade must be free of ponded water and stable prior to and during shot-rock fill placement.
- Where additional soil fill is required to achieve the finished grades, the shot-rock fill should be covered with a non-woven geotextile filter fabric in order to reduce the potential for the migration of soil into the underlying shot-rock. Structural soil fill criteria and placement recommendations are outlined above.
- Shot-rock fill may be used up to the design subgrade elevation in pavement areas. If shot-rock fill is placed to the pavement subgrade elevation, we recommend that it be "choked off" with a thin (3 to 4 inch thick) layer of dense graded aggregate (DGA) prior to constructing the pavement section. The shot-rock fill should also contain sock covered, perforated pipes at least 4-inch diameter to inhibit water from building up beneath the pavement section. The drainage pipe should include a headwall at the outlet end, and

should drain to daylight away from the pavement area. Consider the use of a channel lined ditch at the end of the headwall to reduce erosion.

- Limit the maximum particle size to 12 inches in any one dimension.
- Shot-rock should have adequate smaller rock fragments to effectively "choke" the larger rock pieces by filling the voids or open spaces. The larger rock pieces should lie flat and not overlap each other. The percentage of soil in the fill should be limited to a maximum of 10 percent.
- Place the clean shot-rock fill in maximum 18-inch thick lifts. The actual lift thickness will vary as the particle size and soil content varies.
- Adequate compaction of shot-rock fill normally requires six to eight passes of heavy construction equipment on the fill surface. Typically, the equipment used consists of bulldozers and dump trucks. The geotechnical engineer should evaluate the suitability of the proposed compaction equipment and techniques. Approval of the lift placement and compaction will be determined by a S&ME engineer or geotechnician.

Monitoring of shot-rock must be done visually by an experienced geotechnician working directly and closely with one of our senior geotechnical engineers. Placement of shot-rock is a blend of art and science and the experience of the equipment operator and testing personnel are crucial to achieving the desired performance from the fill. Key indicators include material type, gradation, soil percentage and moisture content, equipment used to place the material, and how the fill material reacts to the equipment. The placement criteria will vary somewhat as the material varies. For example - as the soil content increases, the lift thickness should be decreased.

Site Grading / Site Selection

Site grading plans have not yet been developed. While the depth to weathered rock in the explored areas ranged from about 0.2 to 31.0 feet below existing grades the average depth was about 6 ½ feet. The site grading plan should take into account the following:

- Topsoil thickness ranged from 1 to 12 inches across the site.
- Highly plastic clay soils present at shallow depths.
- Cuts extending just a few feet below the existing ground surface will likely encounter rock in most areas. Rock excavation should be anticipated in utility excavations. If blasting is performed during building pad preparation, consider drilling and blasting to excavate a trench for underground utilities.
- Remediation of sink holes including excavation and filling with properly graded material.

- Elevations across the site vary by as much as 60 feet. We anticipate that free-standing retaining wall, terracing of the site, or a combination of both will be required.
- Depending on the grade selection, a deep rock cut (greater than 20 feet to 30 feet) is possible. If a deep cut is planned the cut slope should be further evaluated and designed by a geotechnical engineer. Fill slopes should also be evaluated by a geotechnical engineer.

Construction Accessibility / Site Degradation

Based on our on-site observations and our experience with similar soil conditions, construction accessibility will be problematic if attempted during cold/wet seasons of the year. Additionally, positive drainage should be maintained at all times during construction. The clay soils will become very soft if they are allowed to absorb water. Construction accessibility should be better during the hot/drier months of the year. During the wet periods, a construction road or pad consisting of a geo-textile fabric overlain by gravel may be required. Soft and/or wet areas may require selective undercutting, repair after construction is completed, or other treatment as recommended by the geotechnical engineer. We recommend that this site be graded and developed during warm, dry months of the year.

Pavement

General Discussion – Site development plans were not yet available; however, we understand that the project will require parking for 1,330 vehicles. Pavement design is a combination of traffic volume (both number and types of vehicles), the subgrade strength, and pavement materials (either asphalt or concrete). Once specific site development plans and grading plans are developed, a pavement design should be performed. For this preliminary exploration we performed two CBR tests of the on-site soils which indicated values of 3.1 percent and 4.1 percent. These results are common for soils throughout central Kentucky.

Flexible Asphalt Pavement **–** In order for pavement to perform satisfactorily, the subgrade soils must have sufficient strength and be stable enough to avoid deterioration from construction traffic and support the paving equipment. In addition, the completed pavement section must resist freeze/thaw cycles and wheel loads from traffic. Generally, construction traffic loading is more severe than the traffic after construction.

The preliminary pavement section given below is based on the assumption that the subgrade is prepared in accordance with the recommendations presented earlier in this report, and that any newly placed fill soils for the pavement subgrade have been compacted to at least 98 percent of

the standard Proctor maximum dry density at moisture contents ranging from ± 3 percent of the soil's optimum moisture content as determined by the standard Proctor test.

Minimizing infiltration of water into the subgrade and rapid removal of subsurface water are essential for the successful long-term performance of the pavement. Both the subgrade and the pavement surface should have a minimum slope of one-quarter inch per foot to promote surface drainage. Edges of the pavement should provide a means of water outlet by extending the aggregate base course through to side ditches. Side ditches should be at least 2 feet below the pavement surface.

The materials should conform and be placed and compacted in accordance with the applicable sections of the Kentucky Transportation Cabinet (KTC) Standard Specifications for Road and Bridge Construction, latest edition. We used the American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993) as a basis for our flexible pavement thickness analysis. The total pavement thickness requirement is a function of the California bearing ratio (CBR). We performed CBR testing on two bulk samples of the on-site soils.

Specific traffic volume estimates were not available; however, we understand that parking for 1,330 vehicles will be required. We estimated the ESAL's for the development based on the anticipated daily traffic. The following pavement design recommendations are based on the assumptions of a 20 year service life, and 50,000 ESAL's for light duty pavement and 1,500,000 ESAL's for heavy duty pavement. Once site development plans are available, a specific pavement design should be performed.

S&ME recommends that the pavement section (base stone and asphalt) be placed after the majority of the new building construction has been completed. S&ME recommends that both binder and surface mix asphalt be placed sequentially before traffic is allowed on the new pavement. **S&ME recommends that the light duty pavement section be used for light automobile parking, and that the heavy duty pavement section be used for drive lanes and roadway.**

If construction sequencing requires that new pavement areas be constructed prior to substantial completion of the building, do not allow construction traffic on the finished pavement. The following pavement sections are based on our ESTIMATED traffic volumes. The sections listed below should be considered as ESTIMATES and used for general budgeting purposes only. A final design should be performed once the final design and use of the project are completed.

ESTIMATED Asphalt Pavement Bearing on Soil with a CBR Value of 3 percent – Maximum Asphalt Option

MATERIAL	LIGHT DUTY	HEAVY DUTY	KY TRANSPORTATION CABINET SPECIFICATION
Asphalt Surface Course	1-½ Inches	1-½ Inches	Section 400
Asphalt Binder Course	5 Inches	9 Inches	Section 400
Dense Graded Aggregate	6 Inches	9 inches	Section 303

ESTIMATED Asphalt Pavement Bearing on Soil with a CBR Value of 3 percent – Maximum Aggregate Option

MATERIAL	LIGHT DUTY	HEAVY DUTY	KY TRANSPORTATION CABINET SPECIFICATION
Asphalt Surface Course	1-½ Inches	1-½ Inches	Section 400
Asphalt Binder Course	3 Inches	6 Inches	Section 400
Dense Graded Aggregate	10 Inches	18 inches	Section 303

Depending on the final site grades, a significant volume of shot rock may be generated during site preparation. Placing shot rock at the pavement subgrade elevations would increase the CBR value and thus possibly allow for a reduction in the above estimated pavement sections.

S&ME should monitor the installation of the asphalt and base, check the installed thickness of the aggregate materials, and perform in-place density tests. Asphalt placement should be monitored full-time to observe placement and compaction procedures. Asphalt samples should be collected periodically and tested for asphalt cement content, aggregate gradation, and Marshall Density.

Impervious Concrete Pavement **–** We recommend that in areas where heavy, concentrated loads are expected (i.e. - dumpster area, entrances, etc.) concrete pavement section be used. For dumpster areas, we recommend that rigid pavement be extended beyond the dumpster pad for the entire length of the garbage truck. The pavement subgrade should be stabilized in accordance with the recommendations for the asphalt paved areas, and the related recommendations in this report. We recommend that the concrete pavement be supported by at least a 6 inch layer of compacted DGA. The DGA should be compacted to a minimum of 98 percent of the standard Proctor maximum dry density. We recommend a minimum concrete section of 8 inches for this site. The concrete should be air-entrained and have a 28-day compressive strength of 4,000 psi. Joint spacing should be at a maximum spacing of 15 feet each way.

Water Management

Management of both surface and subsurface water will be a key issue to development of the site. Subsurface water will tend to migrate toward the sink holes and other lower elevation areas of the site. The earthwork should be phased such that the swales are stabilized and are able to convey water away from the site while maintaining the integrity of the site.

Future Studies

The above items warrant further attention and should be addressed on a more detailed design phase exploration program. Additionally, the design phase geotechnical exploration should address the following:

- Additional plasticity testing and swell testing should be performed to define the potential impact of expansive clays.
- Once structural loading and site grading is determined, additional evaluation should be performed for foundation loading.
- Additional exploration should be performed to further investigate the sink holes on the site and to provide specific recommendations for remediation.
- Cut and/or fill slope stabilities should be evaluated once a site grading plan is developed.

We anticipate a site seismic classification of either "B" or "C" depending on the final building design. It is our experience that a site specific seismic evaluation could allow for a less conservative structural design and realized construction cost savings.

8.0 FOLLOW UP SERVICES

This report is preliminary and is not intended for final design purposes. Additional geotechnical work will be required once specific building locations, types, and grades have been established.

9.0 LIMITATIONS

This report has been prepared for the exclusive use of Commonwealth of Kentucky Finance and Administration Cabinet, Department for Facilities and Support Services for specific application to this project site. Our conclusions and recommendations have been prepared using generally accepted standards of geotechnical engineering practice in the Commonwealth of Kentucky. No other warranty is expressed or implied. This company is not responsible for the conclusions, opinions, or recommendations of others based on these data.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described preliminary geotechnical exploration, and our past experience. They do not reflect variations in the subsurface conditions that are likely to exist between our borings and soundings and in unexplored areas of the site. These variations result from the inherent variability of the general subsurface conditions in this geologic region.

We recommend that the Owner retain S&ME to continue our involvement in the project through the subsequent phases of design and construction. Our firm is not responsible for interpretation of the data contained in this report by others.

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

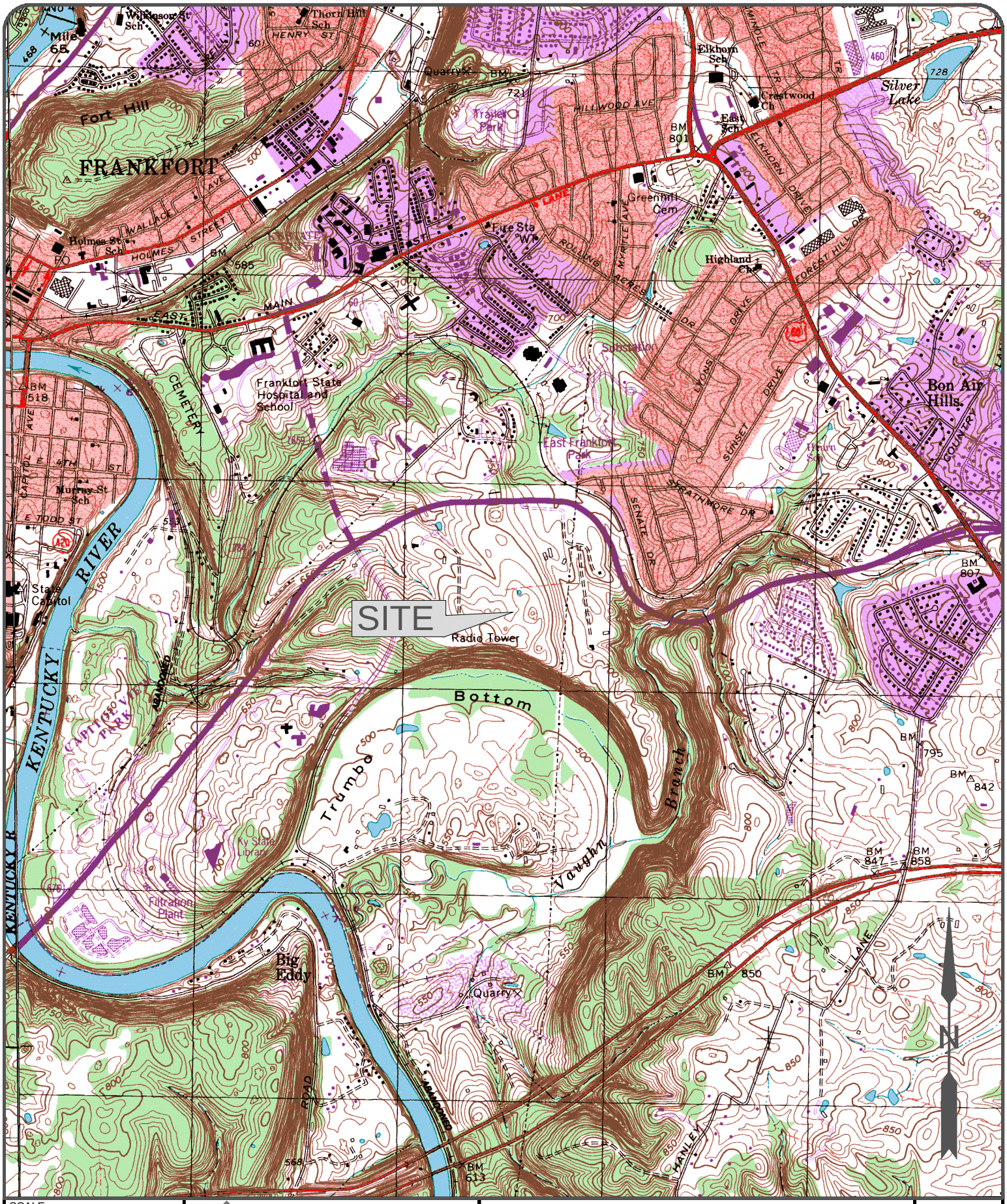
8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

IIGER06085.0MRP

APPENDIX A

SITE LOCATION/TOPOGRAPHIC MAP

BORING LOCATION PLAN



SCALE:	1" = 2000'
DATE:	6/27/2014
DRAWN BY:	LHR
PROJECT NO:	1183-14-027

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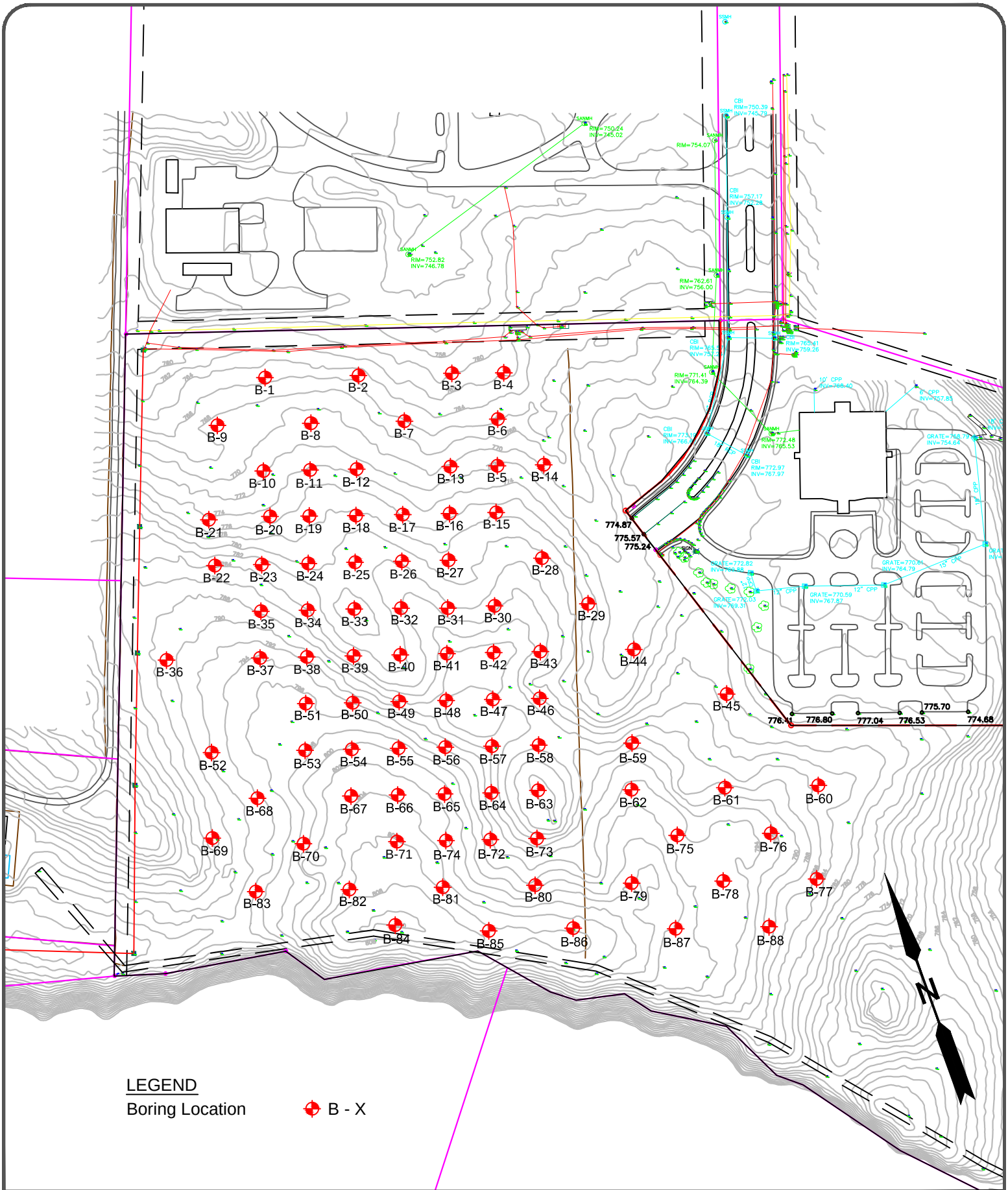
2020 LIBERTY ROAD, SUITE 105
LEXINGTON, KENTUCKY 40505
PHONE: 859-293-5518

SOWER BOULEVARD SITE
VICINITY MAP
FRANKFORT, KENTUCKY

FIGURE NO.
1



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DATE:	7/9/2014
DRAWN BY:	LHR
PROJECT NO:	1183-14-027

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SOWER BOULEVARD SITE
BORING LOCATION PLAN
FRANKFORT, KENTUCKY

FIGURE NO.
2

APPENDIX B

TEST BORING RECORDS LEGEND

TEST BORING RECORDS

FIELD TESTING PROCEDURES

TEST BORING RECORD LEGEND

FINE AND COARSE GRAINED SOIL INFORMATION

COARSE GRAINED SOILS (SANDS & GRAVELS)

N	Relative Density
0-4	Very Loose
5-10	Loose
11-20	Firm
21-30	Very Firm
31-50	Dense
Over 50	Very Dense

FINE GRAINED SOILS (SILTS & CLAYS)

N	Consistency	Qu, KSF Estimated
0-1	Very Soft	0-0.5
2-4	Soft	0.5-1
5-8	Firm	1-2
9-15	Stiff	2-4
16-30	Very Stiff	4-8
Over 31	Hard	8+

PARTICLE SIZE

Boulders	Greater than 300 mm (12 in)
Cobbles	75 mm to 300 mm (3 to 12 in)
Gravel	4.74 mm to 75 mm (3/16 to 3 in)
Coarse Sand	2 mm to 4.75 mm
Medium Sand	0.425 mm to 2 mm
Fine Sand	0.075 mm to 0.425 mm
Silts & Clays	Less than 0.075 mm

The **STANDARD PENETRATION TEST** as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two increments are added together and designate the N-value defined in the above tables.

ROCK PROPERTIES

ROCK QUALITY DESIGNATION (RQD)

Percent RQD	Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

ROCK HARDNESS

Very Hard:	Rock can be broken by heavy hammer blows.
Hard:	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows.
Moderately Hard:	Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken with light hammer blows.
Soft:	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.
Very Soft:	Rock disintegrates or easily compresses when touched; can be hard to very hard soil.

$$\text{Recovery} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

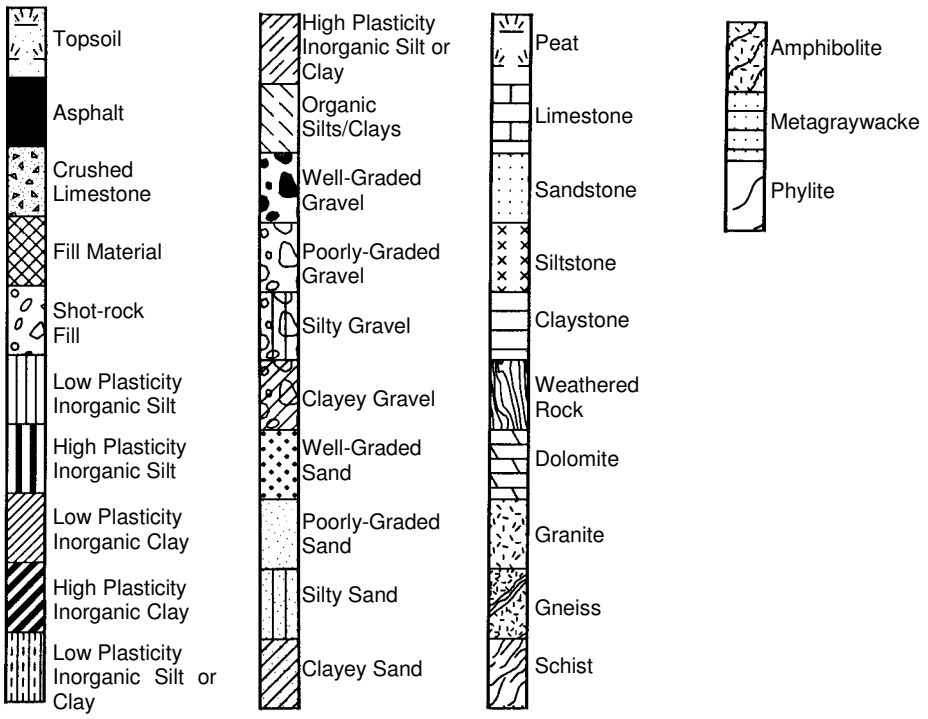
63 REC
NQ
43 RQD

$$\text{RQD} = \frac{\text{Sum of 4 in. and longer Rock Pieces Recovered}}{\text{Length of Core Run}} \times 100$$

Core Diameter	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

SYMBOLS

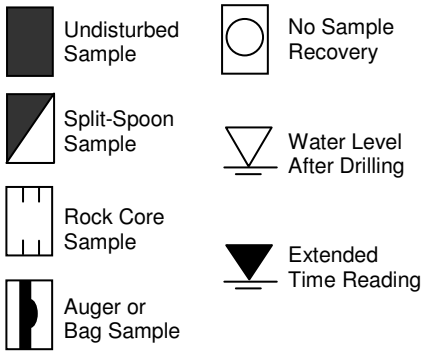
KEY TO MATERIAL TYPES



SOIL PROPERTY SYMBOLS

N:	Standard Penetration, BPF
M:	Moisture Content, %
LL:	Liquid Limit, %
PI:	Plasticity Index, %
Qp:	Pocket Penetrometer Value, TSF
Qu:	Unconfined Compressive Strength Estimated Qu, TSF
γ_D:	Dry Unit Weight, PCF
F:	Fines Content

SAMPLING SYMBOLS



BORING NO: **B- 1**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 765.3	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	765.3	0	Topsoil- 8 inches							
	764.6		Lean Clay (CL) with trace oxide nodules, very stiff, brown, moist			13			●	5 - 7 - 6
	763.3		Fat Clay (CH) with chert fragments, hard, brown to dark brown, moist			10			●	4 - 5 - 21
	761.1		Weathered limestone			0			●	50/4
	760.8	5	Auger Refusal at 4.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 2**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 764.8	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	764.8	0	Topsoil- 10 inches							
	764.0		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			16			●	6 - 7 - 8
						15			●	6 - 6 - 7
	760.8		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			16			●	3 - 4 - 13
		5								
	758.6		Weathered limestone			2			●	50/0.2
	758.1		Auger Refusal at 6.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 3**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 759.7	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	759.7	0	Topsoil- 12 inches							
	758.7		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			15			●	5 - 6 - 6
						18			●	7 - 6 - 8
	755.7		Fat Clay (CH) with chert fragments, hard, brown to dark brown, moist			18			●	6 - 8 - 10
		5								
	753.7		Weathered limestone							
	752.5		Auger Refusal at 7.2 feet			9			●	23 - 50/.2
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 4**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 761.8	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	761.8	0	Topsoil- 6 inches							
	761.3		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			12				5 - 5 - 5
						18				5 - 4 - 6
	757.8		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			16				4 - 4 - 7
		5								
	755.3		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			18				7 - 9 - 12
						18				5 - 7 - 8
		10								
	751.3		Weathered limestone							
	748.7		Auger Refusal at 13.1 feet							
		15								
		20								

BORING NO: **B- 5**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 772.2	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	772.2	0	Topsoil- 6 inches							
	771.7		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			8				3 - 4 - 5
	770.7		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			16				5 - 5 - 5
	769.7		Fat Clay (CH) with chert fragments, stiff, brown to dark brown, moist			18				3 - 5 - 7
	766.9	5	Weathered limestone							
	765.7		Auger Refusal at 6.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 6**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 765.7	BORING STARTED: 6/4/2014	BORING COMPLETED: 6/4/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	765.7	0	Topsoil- 8 inches							
	765.0		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			12				5 - 5 - 6
	763.7		Fat Clay (CH) with trace oxide nodules, very hard, brown to dark brown, moist			8				5 - 5 - 5
	761.4		Weathered limestone			2				50/3
	760.7	5	Auger Refusal at 5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 7**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 765.8	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	765.8	0	Topsoil- 10 inches							
	765.0		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			14			●	4 - 4 - 5
						16			●	4 - 5 - 8
	762.3		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			10			●	3 - 8 - 50/1
	760.8	5	Weathered limestone							
	760.3		Auger Refusal at 5.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 8**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 770.8	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	770.8	0	Topsoil- 11 inches			12				5 - 6 - 4
	769.9		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			14				5 - 5 - 7
						14				
	765.8	5	Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			6				11 - 8 - 7
	763.8		Weathered limestone							
	762.7		Auger Refusal at 8.1 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B- 9**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 769.2	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	769.2	0	Topsoil- 5 inches							
	768.8		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			12				6 - 7 - 6
						12				5 - 6 - 6
		5				16				5 - 4 - 5
	763.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			18				4 - 5 - 8
	759.9		Weathered limestone			6				3 - 50/3
		10								
	758.5		Auger Refusal at 10.7 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-10**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: -412,206.0	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
		0	Topsoil- 8 inches							
	764.3		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			13			●	4 - 6 - 6
						16			●	3 - 4 - 7
	761.0		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			18			●	4 - 5 - 6
		5								
	758.0		Weathered limestone			10			●	8 - 6 - 50/3
	756.9		Auger Refusal at 8.1 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-11**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 774.2	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	774.2	0	Topsoil- 5 inches							
	773.8		Lean Clay (CL) with trace oxide nodules, very stiff, brown, moist			10			●	8 - 4 - 5
	772.2		Fat Clay (CH) with chert fragments, stiff, brown to dark brown, moist			7			>>●	4 - 5 - 50
	770.9		Weathered limestone							
	770.5		Auger Refusal at 3.7 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-12**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 773.2	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	773.2	0	Topsoil- 8 inches							
	772.7		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			16			●	4 - 5 - 5
						11			●	4 - 5 - 9
	770.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
	769.6		Weathered limestone							
	769.2		Auger Refusal at 4 feet / Begin Coring							
		5	Limestone, light gray, fine to medium grained			60/60	53			
			Water stained to 6 feet Few thin clay seams to 8 feet							
		10				60/60	90			
	759.2		Coring Terminated at 14 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-13**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 770.3	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	770.3	0	Topsoil- 6 inches							
	769.8		Lean Clay (CL) with trace oxide nodules, very stiff, brown, moist			14			●	3 - 4 - 7
						16			●	6 - 7 - 10
	766.8		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			10			●	6 - 14 - 50/1
	765.0	5	Weathered limestone							
	764.8		Auger Refusal at 5.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-14**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 769.6	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	769.6	0	Topsoil- 6 inches							
	769.1		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12				3 - 4 - 4
						10				4 - 5 - 6
	766.1		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			18				5 - 4 - 7
		5								
	763.6		Weathered limestone							
	763.2		Auger refusal at 6.4 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-15**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 777.2	BORING STARTED: 6/5/2014	BORING COMPLETED: 6/5/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	777.2	0	Topsoil- 5 inches							
	776.8		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	2 - 3 - 4
	775.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			4			●	2 - 4 - 6
	773.9		Weathered limestone							
	773.5		Auger Refusal at 3.7 feet / Begin Coring							
		5	Limestone, light gray, fine to medium grained			58/60	32			
		10				60/60	83			
	763.5		Coring Terminated at 13.7 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-16**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 775.6	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	775.6	0	Topsoil- 6 inches							
	775.1		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			10			●	3 - 4 - 3
	774.4		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			4			●	50/4
	773.7		Weathered limestone							
	772.6		Auger Refusal at 3 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-17**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 775.6	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	775.6	0	Topsoil- 8 inches							
	774.9		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			14			●	4 - 4 - 5
						18			●	5 - 6 - 8
	771.6		Fat Clay (CH) with chert fragments, stiff to firm, brown to dark brown, moist							
		5				16			●	4 - 5 - 7
						18			●	3 - 3 - 4
	766.3		Weathered limestone			4			●	50/4
	765.2	10	Auger Refusal at 10.4 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-18**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 778.3	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	778.3	0								
	778.0		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8			●	4 - 6 - 6
						6			●	3 - 3 - 5
	775.3		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist							
						12			●	3 - 4 - 50/2
	773.1	5								
	772.6		Weathered limestone							
			Auger Refusal at 5.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-19**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 777.4	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	777.4	0	Topsoil- 8 inches							
	776.7		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			16			●	4 - 4 - 5
						5			●	3 - 3 - 5
	774.4		Auger Refusal at 3 feet			0			●	50/0
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-20**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 775.5	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	775.5	0								
	775.2		Topsoil- 4 inches			14			●	3 - 3 - 4
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	4 - 5 - 4
	771.5									
		5	Fat Clay (CH) with chert fragments, firm to stiff, brown to dark brown, moist			18			●	3 - 3 - 5
						18			●	4 - 6 - 7
		10				18			●	4 - 5 - 8
						6			●	30 - 50/1
		15								
						16			●	3 - 4 - 5
		20								
						10			●	4 - 6 - 50/3
	750.5	25								
	750.3		Weathered limestone							
			Auger Refusal at 25.2 feet							
		30								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-21**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 774.1	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	774.1	0	Topsoil- 6 inches							
	773.6		Lean Clay (CL) with trace oxide nodules, soft, brown, moist			14			●	1 - 2 - 1
	772.6		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			16			●	2 - 2 - 5
	770.1	4	Auger Refusal at 4 feet			0			●	50/0
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-22**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.8	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.8	0	Topsoil- 6 inches							
	783.3		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8				3 - 4 - 4
	781.8		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			6				2 - 3 - 2
		5				6				3 - 3 - 6
	778.0		Weathered limestone							
	777.8		Auger Refusal at 6 feet / Begin Coring							
			Limestone, light gray, fine to medium grained			33/48	31			
			Water stained / minor solutioning to 10.5 feet							
		10								
						57/60	42			
	768.8	15	Coring Terminated at 15 feet							
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-23**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.1	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.1	0								
	782.8		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	3 - 3 - 3
	781.6		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			10			●	3 - 4 - 15
	779.1		Fat Clay (CH) with chert fragments, hard, brown to dark brown, moist			10			●	9 - 17 - 50/3
	778.1	5	Weathered limestone			2				50
	775.3		Auger Refusal at 7.8 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-24**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 779.5	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	779.5	0	Topsoil- 5 inches							
	779.1		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			14			•	3 - 3 - 5
						16			•	5 - 5 - 15
	776.5		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
	775.5		Fat Clay (CH) with chert fragments, hard, brown to dark brown, moist			3			•	50/4
	775.0	5	Weathered limestone							
	774.0		Auger Refusal at 5.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-25**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 781.1	BORING STARTED: 6/6/2014	BORING COMPLETED: 6/6/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	781.1	0	Topsoil- 6 inches							
	780.6		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			6			●	3 - 4 - 4
	779.1		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			6			●	2 - 3 - 8
	776.8					3			●	50/3
	776.6	5	Weathered limestone Auger Refusal at 4.5 feet / Begin Coring Limestone, light gray, fine to medium grained			58/60	57			
		10				59/60	82			
	766.6	15	Coring Terminated at 14.5 feet							
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-26**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 781.4	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	781.4	0	Topsoil- 8 inches							
	780.7		Lean Clay (CL) with trace oxide nodules, stiff to firm, brown, moist			12			●	3 - 4 - 5
	778.9		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			18			●	4 - 3 - 4
	777.4		Fat Clay (CH) with chert fragments, stiff, brown to dark brown, moist			18			●	3 - 5 - 7
		5								
	774.4		Weathered limestone			2			●	50/3
	773.9		Auger Refusal at feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-27**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 778.6	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	778.6	0	Topsoil- 8 inches							
	777.9		Lean Clay (CL) with trace oxide nodules, stiff to very stiff, brown, moist			18			●	3 - 3 - 4
	776.1		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			16			●	4 - 4 - 25
	774.5		Weathered limestone			4			●	50/4
	772.8	5	Auger Refusal at 5.8 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-28**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 780.0	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	780.0	0								
	779.7		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	3 - 4 - 5
						8			●	3 - 2 - 3
	777.0		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist							
		5				16			●	4 - 6 - 7
	774.0		Weathered limestone							
	773.5		Auger Refusal at 6.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-29**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 777.4	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	777.4	0	Topsoil- 6 inches							
	776.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			14			•	3 - 4 - 4
	775.9		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			14			•	4 - 5 - 16
	773.6		Weathered limestone							
		5								
	771.6		Auger Refusal at 5.8 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-30**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.4	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.4	0	Topsoil- .5 inches							
	782.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			10			●	4 - 3 - 4
	781.4		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			10			●	6 - 6 - 1
	780.4		Weathered limestone							
	779.9		Auger Refusal at 3.5 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-31**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 782.6	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	782.6	0	Topsoil- 6 inches							
	782.1		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			8			●	4 - 4 - 4
	780.6		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			6			●	4 - 26 - 50/3
	778.6					1			●	50/1
	778.4		Weathered limestone							
			Auger Refusal at 4.2 feet / Begin Coring							
		5	Limestone, light gray, fine to medium grained							
			Water stained to 9 feet with few very thin mud seams			55/60	45			
		10				42/60	70			
	768.4		Coring Terminated at 14.2 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-32**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.7	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.7	0	Topsoil- 6 inches							
	783.2		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			14			●	4 - 3 - 4
	781.7		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			16			●	2 - 4 - 9
	780.5		Weathered limestone							
	780.1		Auger Refusal at 3.6 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-33**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 779.6	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	779.6	0	Topsoil- 6 inches							
	779.1		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			12			●	3 - 3 - 5
	777.6		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			14			●	12 - 16 - 20
	776.1		Weathered limestone							
	775.3		Auger Refusal at 4.3 feet			2			●	50/2
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-34**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.8	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.8	0	Topsoil- 10 inches							
	783.0		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	2 - 3 - 4
	781.8		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			16			●	4 - 8 - 11
	780.8		Weathered limestone							
	779.8		Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-35**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 787.5	BORING STARTED: 6/7/2014	BORING COMPLETED: 6/7/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	787.5	0	Topsoil- 10 inches							
	786.7		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			14			●	2 - 2 - 3
						18			●	4 - 3 - 5
	784.5		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			16				
	782.4	5	Weathered limestone			1			●	50/1
	779.7		Auger Refusal at 7.8 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-36**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 788.9	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	788.9	0	Topsoil- 6 inches							
	788.4		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	1 - 2 - 4
						16			●	4 - 3 - 4
		5				4			●	3 - 2 - 4
	782.9		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			16			>>●	10 - 26 - 42
	780.7		Weathered limestone							
	780.2		Auger Refusal at 8.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-37**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 793.5	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	793.5	0	Topsoil- 5 inches							
	793.1		Lean Clay (CL) with trace oxide nodules, soft, brown, moist			10			●	1 - 2 - 2
	791.5		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			12			●	4 - 7 - 11
	790.0		Weathered limestone							
	789.8		Auger Refusal at 3.7 feet / Begin Coring							
		5	Limestone, light gray, fine to medium grained							
			Water stained beds to 10 feet			50/60	47			
		10				60/60	63			
	779.8		Coring Terminated at 13.7 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-38**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 790.7	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	790.7	0	Topsoil- 2 inches							
	790.5		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	2 - 2 - 3
	789.5		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			12			●	3 - 3 - 7
	787.2		Weathered limestone							
	786.7		Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-39**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 783.4	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	783.4	0								
	783.2		Topsoil- 2 inches							
	782.4		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			10			●	3 - 4 - 5
			Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			8			●	9 - 50/3
	781.1									
	780.6		Weathered limestone							
			Auger Refusal at 2.8 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-40**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 781.2	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	781.2	0	Topsoil- 4 inches							
	780.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			4			●	2 - 3 - 3
						16			●	3 - 3 - 4
	777.2		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			18			●	5 - 5 - 9
		5								
	774.5		Weathered limestone			2			●	50/2
	773.5		Auger Refusal at 7.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-41**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 787.4	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	787.4	0								
	787.1		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			6			●	3 - 4 - 4
	785.9		Fat Clay (CH) with trace oxide nodules, firm to stiff, brown to dark brown, moist			16			●	4 - 4 - 4
	782.9	5	Weathered limestone			18			>>●	6 - 24 - 28
	780.9		Auger Refusal at 6.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-42**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 789.1	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	789.1	0								
	788.9		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, stiff to firm, brown, moist			12				4 - 4 - 5
	787.6		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			4				3 - 4 - 4
		5				18				5 - 9 - 31
	782.3		Weathered limestone			3				50/3
	781.6		Auger Refusal at 7.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-43**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 785.1	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	785.1	0								
	784.9		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, firm to stiff, brown, moist			12			●	4 - 4 - 3
						6			●	5 - 4 - 25
	782.6		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
	781.3									
	781.1		Weathered limestone							
			Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-44**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 774.1	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	774.1	0	Topsoil- 8 inches							
	773.4		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			12			●	4 - 5 - 6
	772.6		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			6			●	7 - 50/4
	771.7		Weathered limestone							
	771.0		Auger Refusal at 3.1 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-45**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 780.7	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	780.7	0	Topsoil- 10 inches			18				4 - 5 - 5
	779.9		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			18				4 - 4 - 6
	777.7		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			18				4 - 6 - 9
	774.7	5	Fat Clay (CH) with trace oxide nodules, firm to stiff, brown to dark brown, moist few weathered limestone pieces/floaters from 10 to 15 feet			18				4 - 4 - 4
		10				18				3 - 5 - 9
	765.7	15	Fat Clay (CH) with trace oxide nodules, soft, brown to dark brown, moist			16				5 - 4 - 2
		20				10				woh - 1 - 2
		25				6				1 - 1 - 1
		30				10				1 - 2 - 5
	749.7		Weathered limestone							
	748.5		Auger Refusal at 32.2 feet							
		35								
		40								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-46**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 784.2	BORING STARTED: 6/8/2014	BORING COMPLETED: 6/8/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	784.2	0								
	784.0		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	4 - 4 - 13
	782.2		Weathered limestone			3			●	50/4
	780.4		Auger Refusal at 3.8 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-47**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 787.5	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	787.5	0								
	787.3		Topsoil- 2 inches			5			●	11 - 50/3
	786.7		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
	786.6		Weathered limestone							
			Auger Refusal at 0.9 feet / Begin Coring							
			Limestone, light gray, fine to medium grained			43/50	44			
			Water stained with few thin clay seams to 6 feet							
		5								
						58/60	77			
	777.4	10	Coring Terminated at 10.1 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-48**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 788.0	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	788.0	0								
	787.8		Topsoil- 2 inches			2				50/4
	787.5		Weathered limestone							
			Auger Refusal at 0.5 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-49**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 788.0	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	788.0	0								
	787.8		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			8			•	3 - 4 - 5
						10			•	5 - 5 - 8
	785.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
	784.3		Auger Refusal at 3.7 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-50**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 793.7	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	793.7	0	Topsoil- 5 inches							
	793.3		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8			●	2 - 2 - 3
						8			●	2 - 3 - 5
	790.7		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist							
	789.6					3			●	50/3
	789.3		Weathered limestone							
		5	Auger Refusal at 4.4 feet / Begin Coring Limestone, light gray, fine to medium grained Water stained with few thin clay seams to 6 feet			55/60	55			
		10				60/60	80			
	779.3		Coring Terminated at 14.4 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-51**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 796.6	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	796.6	0								
	796.3		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			7			●	2 - 3 - 3
	794.4		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			14			●	2 - 3 - 4
		5				18			●	10 - 19 - 15
	790.0		Weathered limestone			6			●	28 - 50/2
	789.2		Auger Refusal at 7.4 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-52**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 792.0	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	792.0	0	Topsoil- 6 inches							
	791.5		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			10			●	3 - 3 - 3
	790.8		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			14			●	2 - 2 - 4
	790.0		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			0			●	3 - 4 - 6
		5				16			●	4 - 6 - 8
						12			●	6 - 13 - 50/1
	782.0	10	Weathered limestone							
	781.6		Auger Refusal at 10.4 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-53**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 797.6	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	797.6	0	Topsoil- 8 inches							
	796.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	3 - 4 - 3
						14			●	4 - 4 - 6
	794.6		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
		5				16			●	4 - 5 - 7
						12				8 - 50
	789.6		Weathered limestone							
	789.2		Auger Refusal at 8.4 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-54**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 800.6	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	800.6	0	Topsoil- 2 inches							
	800.4		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	3 - 2 - 3
						16			●	2 - 2 - 4
	796.6		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
		5				16			●	3 - 4 - 7
						18			●	6 - 10 - 34
	792.6		Fat Clay (CH) with chert fragments, hard, brown to dark brown, moist							
						9			●	19 - 50/4
	790.6	10	Weathered limestone							
	789.4		Auger Refusal at 11.2 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-55**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 799.0	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	799.0	0								
	798.7		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8			●	2 - 3 - 2
						12			●	2 - 2 - 3
	796.0		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
		5				18			●	5 - 6 - 10
	793.0		Weathered limestone							
	792.6		Auger Refusal at 6.4 feet							
		10								
		15								
		20								

BORING NO: **B-56**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 793.5	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	793.5	0								
	793.4		Topsoil- 1 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			6			●	4 - 4 - 3
	791.5		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			12			●	4 - 5 - 16
						2			●	50/2
	789.0									
	788.8	5	Weathered limestone							
			Auger Refusal at 4.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-57**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 789.5	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	789.5	0	Topsoil- 6 inches							
	789.0		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			12			●	5 - 15 - 11
	787.9		Weathered limestone			0			●	50/3
	786.2		Auger Refusal at 3.3 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-58**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 786.6	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	786.6	0	Topsoil- 10 inches			12				3 - 18 - 50/1
	785.8		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist			2				50/2
	784.6		Weathered limestone							
	784.1		Auger Refusal at 2.5 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-59**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 788.7	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	788.7	0	Topsoil- 6 inches							
	788.2		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			7				3 - 3 - 4
						8				2 - 2 - 3
	785.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			13				3 - 5 - 6
		5								
	782.5		Weathered limestone							
	782.2		Auger Refusal at 6.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-60**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 785.2	BORING STARTED: 6/9/2014	BORING COMPLETED: 6/9/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	785.2	0	Topsoil- 5 inches							
	784.8		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			8			●	3 - 4 - 4
	783.2		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			8			●	3 - 5 - 6
	780.8		Weathered limestone			4			●	50/0.4
	779.5	5	Auger Refusal at 5.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-61**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 788.4	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	788.4	0	Topsoil- 7 inches							
	787.8		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			10			●	3 - 4 - 4
						8			●	4 - 5 - 8
	784.9		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
		5				18			●	4 - 7 - 10
	782.1		Weathered limestone						●	50/0
	781.9		Auger Refusal at 6.5 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-62**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 794.3	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	794.3	0	Topsoil- 5 inches							
	793.9		Lean Clay (CL) with trace oxide nodules, stiff to firm, brown, moist			18				3 - 5 - 6
						10				6 - 5 - 5
	789.3	5	Fat Clay (CH) with trace oxide nodules, stiff to firm, brown to dark brown, moist			12				4 - 3 - 4
						17				3 - 4 - 5
		10				18				3 - 2 - 5
	782.2		Weathered limestone							
	781.9		Auger Refusal at 12.4 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-63**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 781.7	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	781.7	0	Topsoil- 11 inches							
	780.8		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			18				3 - 3 - 4
						18				4 - 5 - 7
		5				12				5 - 5 - 8
	775.7		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			14				5 - 7 - 9
		10				18				5 - 7 - 22
	768.3									
	767.9		Weathered limestone							
		15	Auger Refusal at 13.8 feet / Begin Coring			20/24	21			
			Limestone, light gray, fine to medium grained							
			Water stained beds to 16 feet			58/60	78			
		20								
						35/36	84			
	757.9		Coring Terminated at 23.8 feet							
		25								
		30								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-64**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 790.0	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	790.0	0	Topsoil- 5 inches							
	789.6		Lean Clay (CL) with trace oxide nodules, very stiff, brown, moist			6			●	3 - 6 - 13
	788.2		Fat Clay (CH) with chert fragments, very hard, brown to dark brown, moist			10			●	38 - 10 - 50/2
	787.3		Weathered limestone							
	786.0		Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-65**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 800.9	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	800.9	0	Topsoil- 5 inches							
	800.5		Lean Clay (CL) with trace oxide nodules, soft, brown, moist			6			●	2 - 1 - 1
						14			●	1 - 2 - 2
	796.9		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			12			●	5 - 9 - 8
		5				4			●	5 - 14 - 14
	792.7		Weathered limestone							
	792.3		Auger Refusal at 8.6 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-66**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 803.5	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	803.5	0								
	803.2		Topsoil- 4 inches			14				2 - 2 - 3
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18				3 - 3 - 4
	799.5	5	Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			13				5 - 3 - 6
	797.5		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			16				8 - 12 - 11
						10				20 - 50/4
	793.5	10	Weathered limestone			4/7	0"			
	793.1		Auger Refusal at 10.4 feet / Begin Coring							
			Limestone, light gray, fine to medium grained			51/60	85			
		15	Clay seams to 12 feet							
						60/60	100			
		20								
	782.5		Coring Terminated at 21.0 feet							
		25								
		30								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-67**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 803.6	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	803.6	0	Topsoil- 5 inches							
	803.2		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	2 - 2 - 2
						14			●	2 - 3 - 4
	799.6		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			16			●	5 - 5 - 7
		5				18			●	9 - 11 - 13
		10				13			●	9 - 7 - 12
	790.7		Weathered limestone							
	790.5		Auger Refusal at 13.1 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-68**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 793.6	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	793.6	0								
	793.5		Topsoil- 1 inch							
			Lean Clay (CL) with trace oxide nodules, very stiff, brown, moist			7			●	4 - 6 - 12
	791.9		Fat Clay (CH) with chert fragments, very stiff, brown to dark brown, moist			12			●	16 - 16 - 22
	790.3		Weathered limestone							
	789.6		Auger Refusal at 4 feet / Begin Coring							
		5	Limestone, light gray, fine to medium grained			14/20	0			
			Few thin clay seams to 6 feet Water stained beds to 6.5 feet							
						60/60	78			
		10								
						32/48	50			
	778.8	15	Coring Terminated at 14.8 feet							
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-69**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 787.4	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	787.4	0	Topsoil- 9 inches							
	786.6		Lean Clay (CL) with trace oxide nodules, stiff, brown, moist			14			●	3 - 5 - 5
	785.4		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			3			●	2 - 3 - 4
	783.4	4	Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-70**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 798.9	BORING STARTED: 6/10/2014	BORING COMPLETED: 6/10/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	798.9	0	Topsoil- 12 inches							
	797.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			16			●	4 - 6 - 4
						16			●	3 - 2 - 4
	795.9		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
		5				18			●	4 - 6 - 10
	792.3		Weathered limestone			0			●	50/1
	788.7	10	Auger Refusal at 10.2 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-71**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 806.1	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	806.1	0								
	805.8		Topsoil- 4 inches							
	805.1		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	2 - 2 - 4
			Fat Clay (CH) with trace oxide nodules, firm to stiff, brown to dark brown, moist			6			●	3 - 4 - 4
		5				18			●	3 - 5 - 8
	800.3		Weathered limestone							
	800.0		Auger Refusal at 6.1 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-72**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 794.4	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	794.4	0								
	794.2		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			16			●	3 - 4 - 4
	792.9		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			8			●	7 - 7 - 23
	790.6		Auger Refusal at 3.8 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-73**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 787.6	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	787.6	0								
	787.4		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			7			●	2 - 4 - 3
	786.1		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			4			●	2 - 3 - 5
	783.1					3			●	50/.5
		5	Weathered limestone							
	781.8		Auger Refusal at 58 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-74**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 802.3	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	802.3	0								
	802.0		Topsoil- .7 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8			●	3 - 3 - 2
						10			●	2 - 3 - 3
	798.3		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			16			●	5 - 7 - 10
		5				16			●	16 - 7 - 6
		10				7			●	8 - 12 - 18
	790.3									
	790.1		Weathered limestone							
			Auger Refusal at 12.2 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-75**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 794.5	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	794.5	0								
	794.1		Topsoil- 5 inches							
			Lean Clay (CL) with trace oxide nodules, firm to stiff, brown, moist			18			●	3 - 5 - 5
						14			●	6 - 7 - 9
	791.5		Fat Clay (CH) with trace oxide nodules, hard, brown to dark brown, moist							
						6			●	4 - 50/0.3
	789.8	5	Weathered limestone							
	788.6		Auger Refusal at 5.9 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-76**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 792.4	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	792.4	0	Topsoil- 5 inches							
	792.0		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			18			●	2 - 2 - 4
						9			●	1 - 3 - 3
	789.4		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist							
		5				18			●	3 - 4 - 5
	786.6		Weathered limestone							
	786.4		Auger Refusal at 6 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-77**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 785.2	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	785.2	0								
	784.9		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			6			●	4 - 2 - 3
	783.7		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			10			●	3 - 5 - 9
	781.3									
	781.1		Weathered limestone			0			●	50/0.1
			Auger Refusal at 4.1 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-78**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 794.8	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	794.8	0	Topsoil- 5 inches							
	794.4		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			14				3 - 3 - 4
	792.8		Fat Clay (CH) with trace oxide nodules, stiff, brown to dark brown, moist			6				10 - 5 - 5
	791.5		Weathered limestone							
	791.0		Auger Refusal at 3.8 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-79**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 799.5	BORING STARTED: 6/16/2014	BORING COMPLETED: 6/16/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	799.5	0	Topsoil- 6 inches							
	799.0		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			16				5 - 6 - 4
						13				3 - 3 - 4
	795.5		Fat Clay (CH) with trace oxide nodules, firm to very stiff, brown to dark brown, moist			16				2 - 3 - 4
		5				18				4 - 7 - 12
	791.1		Weathered limestone							
	790.5		Auger Refusal at 9 feet			0				50/0
		10								
		15								
		20								

BORING NO: **B-80**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 797.1	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	797.1	0	Topsoil- 9 inches							
	796.4		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	2 - 2 - 4
						8			●	3 - 3 - 3
	794.1		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist							
		5				14			●	12 - 10 - 11
	791.6		Weathered limestone							
	791.1		Auger Refusal at 6 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-81**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 805.3	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	805.3	0								
	804.9		Topsoil- 5 inches			12			●	3 - 2 - 4
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist							
	803.3		Fat Clay (CH) with trace oxide nodules, firm to very stiff, brown to dark brown, moist			10			●	3 - 3 - 3
		5				18			●	4 - 5 - 9
						18			●	20 - 24 - 24
	797.3		Weathered limestone							
	796.3		Auger Refusal at 9 feet / Begin Coring			0			●	50/0
		10	Limestone, light gray, fine to medium grained			6/19	24			
			clay seams to 12 feet			55/60	17			
		15								
						55/60	80			
		20								
	784.6		Coring Terminated at 20.7 feet							
		25								
		30								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-82**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 806.2	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	806.2	0								
	806.0		Topsoil- 2 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			6			●	5 - 4 - 4
	804.7		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			8			●	2 - 3 - 4
	803.2		Weathered limestone							
	802.7		Auger Refusal at 3.5 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-83**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 794.2	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	794.2	0								
	794.1		Topsoil- 1 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			10			●	3 - 4 - 3
	792.7		Fat Clay (CH) with trace oxide nodules, stiff to very stiff, brown to dark brown, moist			12			●	3 - 4 - 5
		5				18			●	5 - 6 - 10
	788.7									
	788.5		Weathered limestone							
			Auger Refusal at 5.7 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-84**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 809.1	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	809.1	0								
	808.8		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			8			●	3 - 2 - 3
						16			●	3 - 2 - 4
	805.1		Fat Clay (CH) with trace oxide nodules, stiff to very stiff, brown to dark brown, moist			18			●	4 - 6 - 8
		5				18			●	8 - 11 - 21
	800.9		Weathered limestone							
	800.1		Auger Refusal at 9 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-85**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 807.1	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	807.1	0	Topsoil- 2 inches							
	806.9		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	2 - 2 - 3
						12			●	2 - 3 - 3
	803.1		Fat Clay (CH) with trace oxide nodules, stiff to very stiff, brown to dark brown, moist			18			●	6 - 7 - 8
		5				18			●	8 - 11 - 13
	797.3	10	Weathered limestone			10				16 - 50
	796.1		Auger Refusal at 11 feet							
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-86**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 805.7	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	805.7	0	Topsoil- 2 inches							
	805.5		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			14			●	3 - 2 - 3
						14			●	3 - 3 - 3
	801.7		Fat Clay (CH) with trace oxide nodules, very stiff, brown to dark brown, moist			18			●	5 - 7 - 11
		5				16			>>●	20 - 19 - 50
	798.2		Weathered limestone							
	796.8		Auger Refusal at 8.9 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-87**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 797.8	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	797.8	0	Topsoil- 1 inches							
	797.7		Lean Clay (CL) with trace oxide nodules, firm, brown, moist			10			●	3 - 4 - 4
	796.3		Fat Clay (CH) with trace oxide nodules, firm to stiff, brown to dark brown, moist			7			●	3 - 3 - 2
		5				18			●	5 - 6 - 9
	792.1		Weathered limestone							
	791.9		Auger Refusal at 5.9 feet							
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

BORING NO: **B-88**

TEST BORING RECORD

PROJECT: Sower Boulevard	JOB NO: 1183-14-027	REPORT NO:
PROJECT LOCATION: Frankfort, KY		
ELEVATION: 789.0	BORING STARTED: 6/17/2014	BORING COMPLETED: 6/17/2014
DRILLING METHOD: 4" HSA	RIG TYPE: D-50	HAMMER: AUTO
GROUNDWATER (ft): Dry	BORING DIAMETER (IN): 4	SHEET 1 OF 1

Remarks:

Groundwater	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	Lithology	Sample Type	Recovery (in)	RQD (%)	Qu	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50	BLOWS /6"
	789.0	0								
	788.7		Topsoil- 4 inches							
			Lean Clay (CL) with trace oxide nodules, firm, brown, moist			12			●	3 - 3 - 5
	787.5		Fat Clay (CH) with trace oxide nodules, firm, brown to dark brown, moist			6			●	3 - 4 - 3
	785.3									
	785.0		Weathered limestone							
			Auger Refusal at 4 feet							
		5								
		10								
		15								
		20								

CRAIG2 1183-14-027.GPJ QOR_CORP.GDT 7/24/14

FIELD TESTING PROCEDURES

Field Operations: The general field procedures employed by S&ME, Inc. are summarized in ASTM D 420 which is entitled "Investigating and Sampling Soils and Rocks for Engineering Purposes." This recommended practice lists recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the subsurface conditions. These techniques are:

a. Continuous 2-1/2 or 3-1/4 inch I.D. hollow stem augers;
b. Wash borings using roller cone or drag bits (mud or water);
c. Continuous flight augers (ASTM D 1425).

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

The subsurface conditions encountered during drilling are reported on a field test boring record by a field engineer who is on site to direct the drilling operations and log the recovered samples. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soils in general accordance with the procedures outlined in ASTM D 2488 and prepares the final boring records that are the basis for all evaluations and recommendations.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designating the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report. The detailed data collection methods using during this study are discussed on the following pages.

Soil Test Borings: Soil test borings were made at the site at locations shown on the attached Boring Plan. Soil sampling and penetration testing were performed in accordance with ASTM D 1586.

The borings were made by mechanically twisting a 5-5/8" outer diameter auger into the soil. At regular intervals, the drilling tools were removed and samples obtained with a standard 1.4 inch I.D., 2 inch O.D., split tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated the "penetration resistance".

Representative portions of the samples, thus obtained, were placed in glass jars and transported to the laboratory. In the laboratory, the samples were examined to verify the driller's field classifications. Test Boring Records are attached which graphically show the soil descriptions and penetration resistances.

Soil Auger Soundings: Soil auger soundings were made at the site at the locations shown on the attached Boring Location Plan. The soundings were performed by mechanically twisting a steel auger into the soil. However, unlike the soil test borings, a smaller diameter solid stem auger was used and no split-spoon samples were obtained. The driller provided a general description of the soil encountered by observing the soils brought to the surface by the twisting auger. The auger was advanced until refusal materials were encountered and the refusal depth was noted by the driller. The auger is then withdrawn and the depths to water or caved materials are then measured and recorded by the driller.

Soil auger soundings provide a rapid, economical method of obtaining the approximate bedrock depth, groundwater depth, and general soil conditions at locations where detailed soil testing and sampling is not required.

Water Level Readings: Water table readings are normally taken in conjunction with borings and are recorded on the "Test Boring Records". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of the hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The time of boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using an electrical probe to detect the water level surface. Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

APPENDIX C

SUMMARY OF LABORATORY TEST DATA

LABORATORY TESTING PROCEDURES

Form No. 1831-SUM-01
Revision No. : 0
Revision Date: 01/20/12

Lab Summary

S&ME

S&ME, Inc - Lexington 2020 Liberty Road, Suite 105 Lexington, KY 40505

Project No.: 1183-14-027 Report Date: 07/08/14

Project Name: Sower Boulevard Site

Client Name: Finance and Administration

Client Address: 403 Wapping Street, Frankfort, KY 40601

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE	USCS	NATURAL MOISTURE CONTENT,%	ATTERBERG LIMITS			MAX. DRY DENSITY PCF / OPTIMUM MOISTURE %	UNIT WEIGHT, PCF		UNCONFINED COMPRESSIVE STRENGTH,PSF	MATERIAL FINER THAN NO. 200, %	SPECIFIC GRAVITY	CBR, %
					L.L.	P.L.	P.I.		WET	DRY				
B-1	1.5 - 3.0	SPT		28.0										
B-2	1.5 - 3.0	SPT		21.7										
B-2	4.0 - 5.5	SPT		35.4										
B-3	1.5 - 3.0	SPT		22.5										
B-3	4.0 - 5.5	SPT		31.9										
B-4	1.5 - 3.0	SPT		22.1										
B-4	4.0 - 5.5	SPT		22.3										
B-4	6.5 - 8.0	SPT		34.0										
B-4	9.0 - 10.5	SPT		32.1										
B-5	1.5 - 3.0	SPT		22.3										
B-5	4.0 - 5.5	SPT		34.0										
B-6	1.5 - 3.0	SPT		28.6										
B-7	1.5 - 3.0	SPT		25.9										
B-8	1.5 - 3.0	SPT		21.0										
B-8	3.0 - 5.0	UD	CL	29.8	48	19	29		123.8	95.4	2,698			
B-8	5.0 - 6.5	SPT		15.5										
B-9	1.5 - 3.0	SPT		17.9										
B-9	4.0 - 5.5	SPT		23.1										
B-9	6.5 - 8.0	SPT		36.5										
B-10	1.5 - 3.0	SPT		23.4										
B-10	4.0 - 5.5	SPT		37.2										
B-11	1.5 - 3.0	SPT		35.9										

Stephen Bennett — *Technical Responsibility*

_____ — *Signature*

Location Coordinator — *Position*

7/8/2014 — *Date*

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					L.L.	P.L.	P.I.		WET	DRY				
B-12	1.5 - 3.0	SPT		27.8										
B-12	7.3 - 7.9	CORE										6382		
B-13	1.5 - 3.0	SPT		21.9										
B-13	4.0 - 5.5	SPT		33.7										
B-14	1.5 - 3.0	SPT		21.9										
B-14	4.0 - 5.1	SPT		25.4										
B-15	1.5 - 3.0	SPT		27.2										
B-15	10.0 - 10.5	CORE										8442		
B-17	1.5 - 3.0	SPT		22.3										
B-17	4.0 - 5.5	SPT		23.8										
B-17	3.0 - 8.0	SPT		33.4										
B-18	1.5 - 3.0	SPT		34.7										
B-18	4.0 - 5.5	SPT		29.2										
B-19	1.5 - 3.0	SPT		32.6										
B-20	1.5 - 3.0	SPT		21.6										
B-20	4.0 - 5.5	SPT	CH	24.2	57	22	35							
B-20	6.5 - 8.0	SPT		31.0										
B-20	9.0 - 10.5	SPT		30.9										
B-20	19.0 - 20.5	SPT	CH	29.5	70	24	46							
B-21	1.5 - 3.0	SPT		32.5										
B-22	1.5 - 3.0	SPT		34.2										
B-22	4.0 - 5.5	SPT		34.5										
B-22	8.7 - 9.3	CORE										5469		

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					L.L.	P.L.	P.I.		WET	DRY				
B-23	1.5 - 3.0	SPT		30.7										
B-23	4.0 - 5.5	SPT		10.3										
B-24	1.5 - 3.0	SPT		15.8										
B-25	1.5 - 3.0	SPT		25.8										
B-25	5.5 - 6.3	CORE									8,809			
B-26	1.5 - 3.0	SPT		25.7										
B-26	4.0 - 5.5	SPT		27.0										
B-27	1.5 - 3.0	SPT		27.0										
B-28	1.5 - 3.0	SPT		30.7										
B-28	4.0 - 5.5	SPT		23.2										
B-29	1.5 - 3.0	SPT		32.6										
B-30	1.5 - 3.0	SPT		24.1										
B-31	1.5 - 3.0	SPT		3.7										
B-31	9.4 - 9.8	CORE									6,049			
B-32	1.5 - 3.0	SPT		28.5										
B-33	1.5 - 3.0	SPT		9.4										
B-34	1.5 - 3.0	SPT		31.5										
B-35	1.5 - 3.0	SPT		23.7										
B-35	3.0 - 5.0	UD	CH	28.1	67	23	44		121.9	95.1	5,346			

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					L.L.	P.L.	P.I.		WET	DRY				
B-36	1.5 - 3.0	SPT		24.9										
B-36	4.0 - 5.5	SPT		25.1										
B-36	6.5 - 8.0	SPT		32.7										
B-37	1.5 - 3.0	SPT		31.9										
B-37	4.0 - 4.9	CORE									11,606			
B-38	1.5 - 3.0	SPT		32.6										
B-40	1.0 - 5.0	BULK	CL	28.5	49	24	25	98.0 / 22.7						
B-40	1.5 - 3.0	SPT		28.8										
B-40	4.0 - 5.5	SPT		29.6										
B-41	1.5 - 3.0	SPT		26.7										
B-41	4.0 - 5.5	SPT		27.2										
B-42	1.5 - 3.0	SPT		34.7										
B-43	1.5 - 3.0	SPT		26.5										
B-45	1.5 - 3.0	SPT		22.2										
B-45	4.0 - 5.5	SPT		22.1										
B-45	6.5 - 8.0	SPT		35.3										
B-45	9.0 - 10.5	SPT		32.9										
B-45	14.0 - 15.5	SPT		33.8										
B-47	2.6 - 3.1	CORE									16,495			
B-49	1.5 - 3.0	SPT		28.8										
B-50	1.5 - 3.0	SPT		27.8										
B-50	7.4 - 7.8	CORE									19,052			

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					L.L.	P.L.	P.I.		WET	DRY				
B-51	1.5 - 3.0	SPT		29.8										
B-51	4.0 - 5.5	SPT		23.0										
B-52	1.0 - 5.0	BULK	CH	23.8	63	23	40	97.1 / 24.3						4.1
B-52	1.5 - 3.0	SPT		25.0										
B-52	6.5 - 8.0	SPT		28.9										
B-53	1.5 - 3.0	SPT		25.1										
B-53	4.0 - 5.5	SPT		24.5										
B-54	1.5 - 3.0	SPT		30.2										
B-54	4.0 - 5.5	SPT		28.0										
B-54	6.5 - 8.0	SPT		25.9										
B-55	1.5 - 3.0	SPT		32.4										
B-55	4.0 - 5.5	SPT		29.6										
B-56	1.5 - 3.0	SPT		26.3										
B-59	1.5 - 3.0	SPT		22.0										
B-59	4.0 - 5.5	SPT		33.2										
B-61	1.5 - 3.0	SPT		28.7										
B-61	4.0 - 5.5	SPT		21.3										
B-62	1.5 - 3.0	SPT		22.6										
B-62	4.0 - 5.5	SPT		31.2										
B-62	6.5 - 8.0	SPT		33.0										
B-62	9.0 - 10.5	SPT		31.2										
B-63	18-18.4	CORE									6,887			
B-63	1.5 - 3.0	SPT		27.6										
B-63	4.0 - 5.5	SPT		27.9										
B-63	6.5 - 8.0	SPT		24.9										
B-63	9.0 - 10.5	SPT		30.7										

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					L.L.	P.L.	P.I.		WET	DRY				
B-64	1.5 - 2.8	SPT		14.2										
B-65	1.5 - 3.0	SPT		32.1										
B-65	4.0 - 5.5	SPT		18.3										
B-65	6.5 -8 .0	SPT		22.2										
B-66	1.5 - 3.0	SPT		24.2										
B-66	4.0 - 5.5	SPT		28.8										
B-66	6.5 -8 .0	SPT		20.6										
B-66	14.7 - 15.4	CORE									10,446			
B-67	1.5 - 3.0	SPT		25.3										
B-67	4.0 - 5.5	SPT		36.1										
B-67	6.5 -8 .0	SPT		14.5										
B-67	9.0 - 10.5	SPT		29.7										
B-68	1.5 - 3.0	SPT		16.3										
B-68	7.6 - 8.0	CORE									8,562			
B-69	1.5 - 3.0	SPT		26.7										
B-70	1.5 - 3.0	SPT		30.3										
B-70	4.0 - 5.5	SPT	CH	23.6	66	22	44							
B-71	1.5 - 3.0	SPT		31.5										
B-71	4.0 - 5.5	SPT		29.2										
B-72	1.5 - 3.0	SPT		16.7										
B-73	1.5 - 3.0	SPT		25.9										
B-74	1.5 - 3.0	SPT		32.5										
B-74	4.0 - 5.5	SPT	CH	28.8	65	25	40							
B-74	6.5 -8 .0	SPT		21.5										
B-74	9.0 - 10.5	SPT	CL	25.1	47	19	28							

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					L.L.	P.L.	P.I.		WET	DRY				
B-75	0.0 - 5.0	BULK	CH	25.8	51	21	30	102.0 / 21.0						
B-75	1.5 - 3.0	SPT		21.2										
B-76	1.5 - 3.0	SPT		25.2										
B-76	4.0 - 5.5	SPT		32.4										
B-77	1.5 - 3.0	SPT		29.4										
B-78	1.5 - 3.0	SPT		25.4										
B-79	1.5 - 3.0	SPT		24.0										
B-79	4.0 - 5.5	SPT		33.2										
B-79	6.5 - 8.0	SPT		25.6										
B-80	1.5 - 3.0	SPT		30.8										
B-80	4.0 - 5.5	SPT		17.2										
B-81	1.5 - 3.0	SPT		31.5										
B-81	4.0 - 5.5	SPT		25.9										
B-81	17.3 - 17.7	CORE									8,320			
B-82	1.5 - 3.0	SPT		33.4										
B-83	1.5 - 3.0	SPT		32.3										
B-84	1.0 - 5.0	BULK	CH	29.2	64	22	42	97.0 / 26.0						3.1
B-84	1.5 - 3.0	SPT		25.8										
B-84	4.0 - 5.5	SPT		28.5										
B-84	6.5 - 8.0	SPT		24.2										
B-85	1.5 - 3.0	SPT		21.5										
B-85	4.0 - 5.5	SPT		26.0										
B-85	6.5 - 8.0	SPT		23.3										

Stephen Bennett — *Technical Responsibility*

Signature

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					L.L.	P.L.	P.I.		WET	DRY				
B-86	1.5 - 3.0	SPT		21.6										
B-86	4.0 - 5.5	SPT		31.5										
B-86	6.5 - 8.0	SPT		21.1										
B-87	1.5 - 3.0	SPT		29.9										
B-87	4.0 - 5.5	SPT		28.8										
B-88	1.5 - 3.0	SPT		31.4										

Stephen Bennett — *Technical Responsibility*

_____ — *Signature*

Location Coordinator — *Position*

7/8/2014 — *Date*

LABORATORY TESTING PROCEDURES

Soil Classification: Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current problems. In our investigations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our "Test Boring Records."

The classification system discussed above is primarily qualitative and for detailed soil classification two laboratory tests are necessary: grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D 2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in this report.

Compaction Tests: Compaction tests are run on representative soil samples to determine the dry density obtained by a uniform compactive effort at varying moisture contents. The results of the test are used to determine the moisture content and unit weight desired in the field for similar soils. Proper field compaction is necessary to decrease future settlements, increase the shear strength of the soil and decrease the permeability of the soil.

The two most commonly used compaction tests are the Standard Proctor test and the Modified Proctor test. They are performed in accordance with ASTM D 698 and D 1557, respectively. Generally, the Standard Proctor compaction test is run on samples from building or parking areas where small compaction equipment is anticipated. The Modified compaction test is generally performed for heavy structures, highways, and other areas where large compaction equipment is expected. In both tests a representative soil sample is placed in a mold and compacted with a compaction hammer. Both tests have four alternate methods.

Test	Method	Hammer Wt./Fall	Mold Diam.	Run on Matl. Finer Than	No. of Layers	No. of Blows/Layer
Standard	A	5.5 lb./12"	4"	No. 4 sieve	3	25
D 698	B	5.5 lb./12"	4"	3/8" sieve	3	25
	C	5.5 lb./12"	6"	3/4" sieve	3	56

Test	Method	Hammer Wt./Fall	Mold Diam.	Run on Matl. Finer Than	No. of Layers	No. of Blows/Layer
Modified	A	10 lb./18"	4"	No. 4 sieve	5	25
D 1557	B	10 lb./18"	4"	3/8" sieve	5	25
	C	10 lb./18"	6"	3/4" sieve	5	56

The moisture content and unit weight of each compacted sample is determined. Usually 4 to 5 such tests are run at different moisture contents. Test results are presented in the form of a dry unit weight versus moisture content curve. The compaction method used and any deviations from the recommended procedures are noted in this report.

Atterberg Limits: Portions of the samples are taken for Atterberg Limits testing to determine the plasticity characteristics of the soil. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. It is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil becomes sufficiently "wet" to flow as a heavy viscous fluid. The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into tiny threads. The liquid limit and plastic limit are determined in accordance with ASTM D 4318.

Moisture Content: The Moisture Content is determined according to ASTM D 2216.

APPENDIX D

ACI 302.1R-96

GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

ADDENDUM
GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION (302.1R-96)
Vapor Retarder Location

The report of ACI Committee 302, "Guide for Concrete Floor and Slab Construction (ACI 302.1R-96)" states in section 4.1.5 that "if a vapor barrier or retarder is required due to local conditions, these products should be placed under a minimum of 4 in. (100 mm) of trimable, compactible, granular fill (not sand)." ACI Committee 302 on Construction of Concrete Floors, and Committee 360 on Design of Slabs on Ground have found examples where this approach may have contributed to floor covering problems.

Based on the review of the details of problem installations, it became clear that the fill course above the vapor retarder can take on water from rain, wet-curing, wet-grinding or cutting, and cleaning. Unable to drain, the wet or saturated fill provides an additional source of water that contributes to moisture-vapor emission rates from the slab well in excess of the 3 to 5 lb/1000 ft^2/24 h (1.46 to 2.44 kg/100 m^2/24 h) recommendation of the floor covering manufacturers.

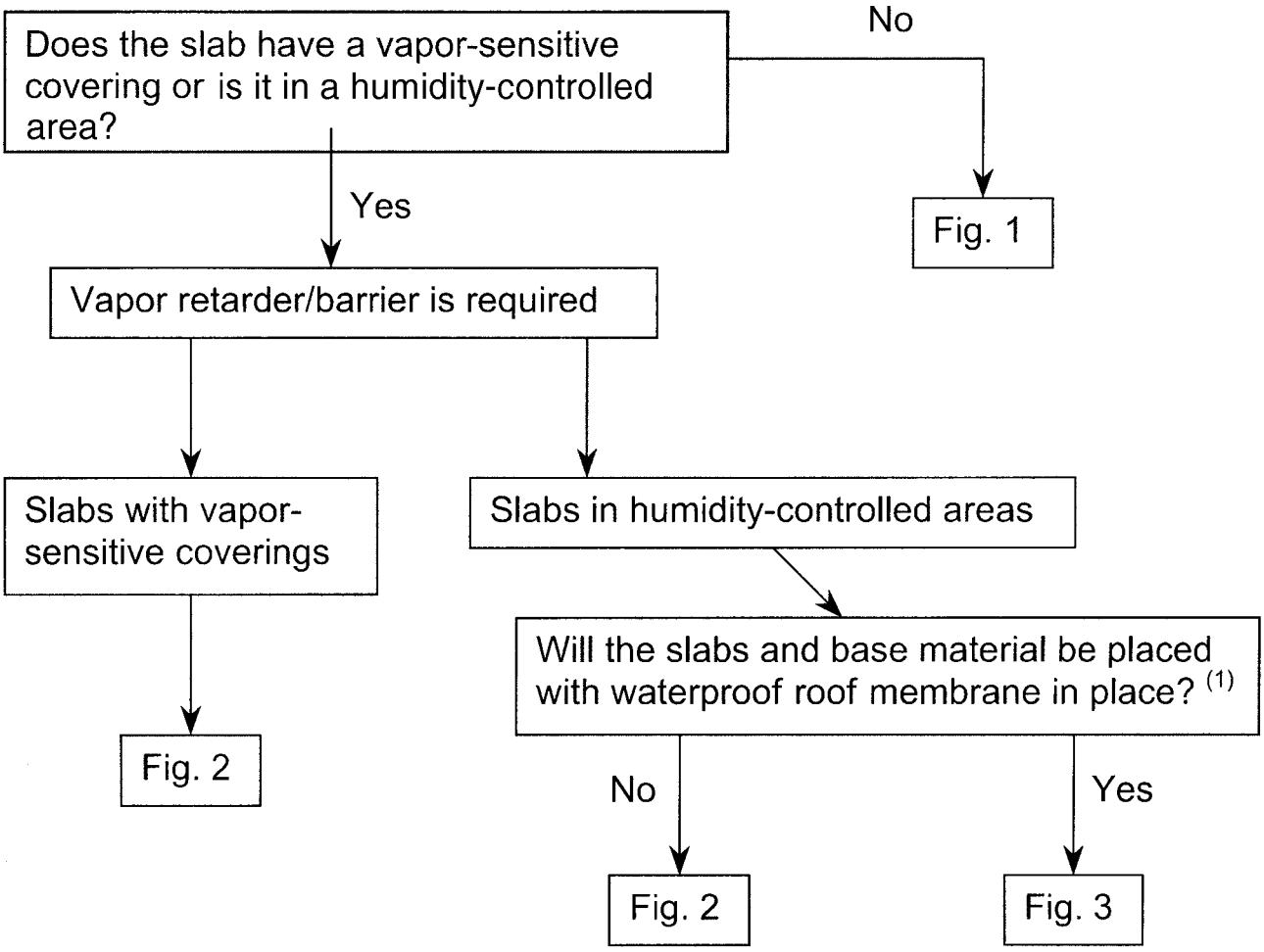
As a result of these experiences, and the difficulty in adequately protecting the fill course from water during the construction process, caution is advised on the use of the granular fill layer when moisture-sensitive finishes are to be applied to the slab surface.

The committees believe that when the use of a vapor retarder or barrier is required, the decision whether to locate the retarder or barrier in direct contact with the slab or beneath a layer of granular fill should be made on a case-by-case basis.

Each proposed installation should be independently evaluated by considering the moisture sensitivity of subsequent floor finishes, anticipated project conditions and the potential effects of slab curling and cracking.

The following chart can be used to assist in deciding where to place the vapor retarder. The anticipated benefits and risks associated with the specified location of the vapor retarder should be reviewed with all appropriate parties before construction.

ADDENDUM
GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION (302.1R-96)
Flow Chart for Location of Vapor Retarder/Barrier



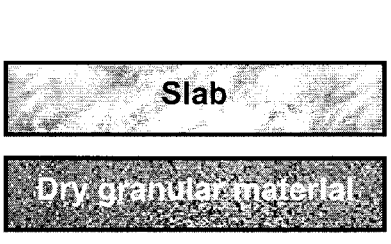


Figure 1

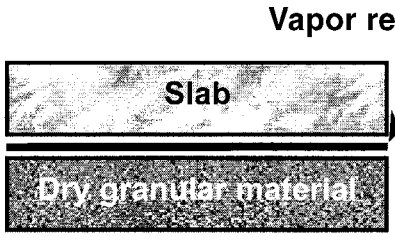


Figure 2 (2)

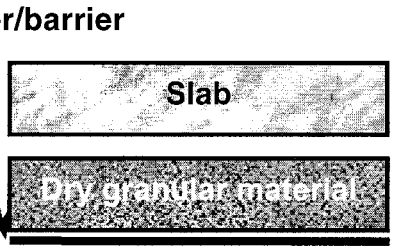


Figure 3

(1) If granular material is subject to future moisture infiltration, use Fig. 2

(2) If Fig. 2 is used, reduced joint spacing, a concrete with low shrinkage potential, or other measures to minimize slab curling will likely be required.